Alaska Department of Environmental Conservation
Spill Prevention and Response Division

Ecological Risk Assessments

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In this Fact Sheet

Glossary

assessment endpoint: an adverse effect on a plant or animal population whose risk for harm is evaluated.

***contaminant*:** a substance that poses a risk to human health or the environment.

exposure pathway: the course a contaminant takes from a source of contamination to the body. Inhalation, ingestion, and skin exposure are the main exposure routes a contaminant takes.

***measurement endpoint*:** a measurable biological effect of exposure to a contaminant that is related to the chosen assessment endpoint.

***receptor*:** a plant or animal that may be affected by the contaminants.

What Is an Ecological Risk Assessment?

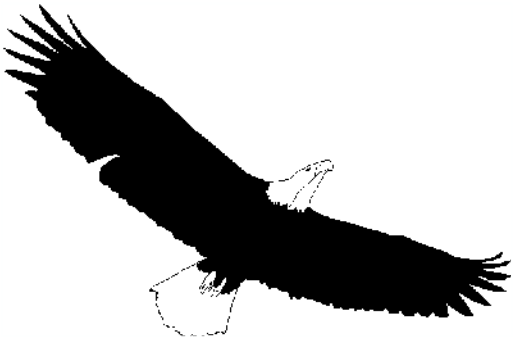
It is a scientific process that determines the probability of harm to plants and animals that may be exposed to hazardous substances from a contaminated site. It is used to:

- study how a plant or animal can become exposed to a contaminant.
- determine if the ecosystem at or near a site will be adversely affected.

What is the Ecological Risk Assessment Process?

There are five main activities:

1. *Preliminary problem formulation* identifies each contaminant of concern and its concentration, source, and location at the site. It also identifies how contamination is likely to spread, and how plants and animals may be exposed to it, such as breathing vapors, eating, drinking or skin contact. This information is used to create a diagram, or flow chart, for the ecosystem that shows the plant and animal species that could be at risk and how the contaminant could get to each species. This model is called a conceptual site model. The conceptual site model can be modified as the risk assessment progresses.



2. *Ecological effects evaluation* involves finding out what amounts of a contaminant cause health problems in the plant and animal species potentially exposed. The evaluation involves reviewing literature, doing field studies, and comparing effects of the contam-inant at other sites to the effect found or anticipated on the site being studied.
3. *Preliminary risk calculation* uses mathematical formulas to determine the potential risk to each of the species from the expected exposure to a contaminant. These are compared to the highest exposure level at which no adverse effects are known to occur, or “risk-based benchmarks.”
4. *Problem formulation* involves refining the preliminary problem formulation using information specific to the site. At this point the most

***sensitive environment*:** an area important for supporting people, plants, and animals. Examples can include: fish spawning areas, waterfowl nesting areas, drinking and food processing water sources, a stream with low or intermittent flow, and wetlands.

Reference List

ADEC *Oil and Hazardous Substances Pollution Control Regulations*, August 8, 2003.
www.state.ak.us/dec/regulations/pdfs/75mas.pdf

USEPA Superfund Risk Assessment web page.
www.epa.gov/superfund/programs/risk/index.htm

USEPA Tools for Ecological Risk Assessment
www.epa.gov/superfund/programs/risk/tooleco.htm

This fact sheet is one of a series of free publications prepared by DEC to help people understand contaminated site cleanup issues. The others can be found at **www.state.ak.us/dec/spar/faq.htm#csp**

sensitive or important plant and animal species are selected to focus the assessment on. The effects on these species are called assessment endpoints.

5. *Risk characterization* combines information about **exposure** to the contaminant and the **toxicity** of the contaminant to determine the **level of risk**. The characterization also includes assumptions and the levels of uncertainty used. These factors are compared to state regulatory standards in regulation to determine risk-basked cleanup levels.

How Are the Results Used?

The risk assessment helps determine whether cleanup is necessary for adequate protection of the environment. If cleanup is necessary, cleanup levels are determined that allow the site to be used for its intended purpose while protecting local plant and animal species of concern.

Some other important uses of these assessments include:

- *Prioritizing goals and projects.* Risk assessments provide a basis for ranking sites according to their potential impact on human health and the environment.
- *Setting site-specific remedial goals*. Risk assessments provide a way to determine how much cleanup is needed at a particular site to protect human health and the environment.

How Can a Community Member Participate in the Process?

There are several important places in the process for citizens to review and comment on a risk assessment, including the various pathways that could lead to plant and animal exposures to contaminants and the assessment endpoints. For example, recreational use of an area, food gathering in or near the site, or children playing in or near a site are ways in which people could come in contact with the contaminant. People can comment on the conceptual site model, the risk assessment workplan, and the assessment itself. ADEC encourages citizens to contact the ADEC project manager if they have concerns about the exposure pathways and assessment endpoints with a specific contaminated site.

For More Information

Alaska Department of Environmental Conservation

Main Offices: Anchorage: 907-269-7503 Juneau: 907-465-5390
Kenai: 907-262-5210 Fairbanks: 907-451-2153

Homepage: **www.state.ak.us/dec/spar/csp**